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Designing Performance Measurement Systems Using Business Models

Marco Montemari[1], Maria Serena Chiucchi[2], Christian Nielsen[3]

Abstract

Purpose: The purpose of this paper is to explore how business models (BMs) can guide the design of a performance measurement system (PMS) and to shed light on the advantages and disadvantages of using BMs as a platform for designing a PMS and identifying key performance indicators (KPIs).

Design/Methodology/Approach: First, a normative approach is adopted to both reflect on the process leading from BMs to KPIs and highlight the role of concrete BM tools that management can use in this process. Second, a case study illustrates the applicability of the process and explores advantages and disadvantages that may arise when using the BM as a basis to identify KPIs.

Findings: Designing KPIs from the BM increases the relevance of the resulting PMS. Furthermore, BM tools support the identification, coordination, and prioritization of value drivers (VDs) (and the related KPIs), increasing the likelihood that managerial choices are focused on corporate value creation. However, the path leading from the BM to KPIs is strenuous and complex and it requires an in-depth knowledge of BM tools.

Research limitations/Implications: While the general limitations of case-based research should be acknowledged, the wider-ranging implications of the research are important not only for BM researchers, but also for scholars and practitioners working with management control.

Practical Implications: The paper describes a practical implementation process that managers can use to map their company's BM, to identify and organize VDs, and, from that design, KPIs. This process has the potential to support the decision-making process in choosing relevant KPIs based on the BM, to aid in the management of the company's performance and to help manage, innovate, and benchmark the BM itself.

Originality/Value: This paper advances our knowledge by addressing the usefulness of BMs from a performance measurement perspective.

Keywords: Business models, Business model configurations, Performance measurement systems, Key performance indicators, Benchmarking.

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1-2 Università Politecnica delle Marche (Ancona, Italy).
3 Aalborg University in Denmark.

Introduction

The intricate connection between key performance indicators (KPIs) and results, whatever the type achieved, has been expressed by many scholars over the last decades:

- "What you measure is what you get" (Kaplan and Norton, 1992, p. 71)
- "You get what you measure and reward" (Wallace, 1997, p. 290)
- "What gets measured, gets done" (Otley, 1999, p. 368)
- "If you want to manage it, you've got to measure it" (Lyons, Gumbus and Bellhouse, 2003, p. 35)
- "What you don't measure you'll never know until it's too late" (Adams and Neely, 2000, p. 19)
- "If your performance measures do not reflect your business model, then you're probably not getting what you bargained for" (this paper).

The business model (BM) concept has caught and held the attention of academics and practitioners over the past fifteen years (Fielt, 2013; McGrath, 2010; Zott, Amit and Massa, 2011), as evidenced by the plethora of frameworks and tools devised to design (Chatterjee, 2013; Ricart, 2011) and innovate (Gassmann, Frankenberger, and Csik, 2014; Taran, Nielsen, Montemari, Thomsen and Paolone, 2016) BMs in companies. Recent reviews (cf. Foss and Saebi, 2017; Nielsen, Lund, Montemari, Paolone, Massaro and Dumay, 2018; Wirtz, Göttel and Daiser, 2016) underscore the maturity of the field. Scholars have addressed issues such as which BMs work best in various contexts (Chesbrough, 2007; Jansson, Ahokangas, Iivari, Perälä-Heape and Salo, 2014), and which ones generate the highest value (Peyton, Lueg, Khusainova, Iversen and Panti, 2014; Yrjölä, 2014), are sustainable (Bocken, Short, Rana and Evans, 2014), or offer scalability opportunities (Nielsen and Lund, 2018; Sang Un Chae and Hedman, 2015; Thompson and MacMillan, 2010). There has also been recent interest in understanding what happens when internal elements of the business model change (Demil and Lecocq, 2010; Lund and Nielsen, 2014), and what happens to it when the external environment changes (Cavalcante, 2013; Wei, Yang, Sun and Gu, 2014).

As has been argued from multiple perspectives, it is evident that the features of BMs significantly affect the performance of companies (Rédis, 2009; Zott and Amit, 2007, 2008). Nielsen, Roslender and Bukh (2009) and Nielsen and Montemari (2012) further argue that a BM is the natural platform upon which the organization operationalizes and executes its strategy. This point is stressed by Osterwalder and Pigneur (2010), who note that BMs essentially describe how value is created, delivered, and captured. Adding complexity to the matter, Taran *et al.* (2016) argue that when companies compete using different BM configurations, they are not creating value in the same manner and thus, will likely have different value drivers (VDs). Therefore, BMs ought to have important implications for the design and implementation of performance measurement systems (PMSs). However, questions remain about how that coupling is created. Answering such questions offers an important contribution to furthering our knowledge of how to manage different types of BMs.

Currently, no studies have explicitly addressed the link between BMs and PMSs. In fact, there has been little discussion about how the BM perspective can support performance measurement and management at all (Montemari and Chiucchi, 2017; Nielsen *et al.*, 2009; Nielsen and Roslender, 2015), despite a common understanding that the BM is useful for identifying VDs and for extracting key performance indicators (KPIs) (Bititci, Garengo, Dörfler, and Nudurupati, 2012; Hoque, 2014; Melnyk, Bititci, Platts, Tobias, and Andersen, 2014), especially from the abstraction-level of taxonomies (Nielsen, Lund and Thomsen, 2017). Hence, the research question guiding this paper is: How can BMs guide the design of a PMS?

By adopting a normative approach to understand the process leading from BM design to performance measurement, and by illustrating this with a case study, this paper explores the advantages and disadvantages of utilizing BMs as a platform for designing PMSs. The structure of the remainder of the paper is as follows. Section 2 presents theoretical perspectives relating to BMs and KPIs, Section 3 describes the method chosen to answer the research question, Section 4 describes the process leading from BM to the design of a PMS, Section 5 presents the case study, and Section 6 discusses the findings of the paper and concludes by highlighting the main contributions.

2. Theoretical perspectives

To understand how PMSs are designed, this paper analyses the links between BMs, VDs and KPIs. This section initially outlines the connection between VDs and KPIs before discussing the link between BMs and VDs.

The relevance of value drivers for identifying key performance indicators

Since the seminal piece by Johnson and Kaplan (1987) entitled "Relevance Lost – The Rise and Fall of Management Accounting", the theme of multidimensional performance measurement has caught the attention of academics and practitioners alike. Prior to Johnson and Kaplan's work, PMSs were focused only on the financial aspects of performance, that is, on costs and efficiency, and this hindered their ability to capture other fundamental dimensions of performance, such as innovation, customer satisfaction, personnel competencies, product and process quality, and timeliness. This drawback led to the proliferation of PMSs aimed at measuring both financial and non-financial dimensions of performance, such as the Balanced Scorecard (Kaplan and Norton, 1992), the Smart Pyramid (Lynch and Cross, 1991), and the Performance Prism (Neely, Adams and Kennerley, 2002), to name a few.

Following this notion, a PMS can be defined as a set of KPIs used to quantify both the efficiency and the effectiveness of managerial actions (Neely, Gregory and Platts, 2005, p. 1129). The use of KPIs is widespread in contemporary companies (Bititci *et al.*, 2012, p. 305) in guiding the decision-making process of managers to improve value creation (Kaplan and Norton, 2004). KPIs "selected for their perceived ability to give information beyond the number per se" (Catasús and Gröjer, 2006, p. 188), can be used as inputs for the managerial decision-making process. In other words, KPIs are devices for intervening with people, objects, and processes; this implies that when KPIs are present, specific actions are expected (Miller and O'Leary, 2002). KPIs should therefore not merely conform to a description of past events, but should assist managers in making sense of the present and outlining future trajectories (Mouritsen, 2004).

KPIs can be of a financial or non-financial nature (Johnson and Kaplan, 1987). Financial KPIs are expressed in monetary units and typically stem from income statement or balance sheet components. They may provide management with information on profitability, sales, costs, and liquidity across relevant dimensions of performance (product lines, channels, customers, geographical areas). Non-financial KPIs are not expressed in monetary units and typically assess the activities that a company deems relevant to achieving its strategic objectives. Like financial KPIs, non-financial KPIs may express dimensions such as resources, activities, and effects, despite the non-monetary unit (Nielsen, Bukh, Mouritsen, Rosenkrands, Johansen and Gormsen, 2006). Typical non-financial KPIs concern customer relationships, employees, operations, quality, cycle-time, and innovation.

As mentioned at the beginning of the section, research has highlighted the need to balance financial and non-financial KPIs to effectively measure a company's performance (Eccles, 1991; Kaplan and Norton, 1992; Lynch and Cross, 1991; Nanni, Dixon and Vollmann, 1992). This need stems from the inability of financial KPIs to adequately represent company performance by themselves (Lev, 2001). One of the problems with financial KPIs is that they are lagging measures, meaning that they merely measure outcomes of managerial actions, taking focus away from what actually generates the results (Kaplan and Norton, 1996). Non-financial KPIs, on the other hand, typically represent leading measures, as they capture the causes of the company's success (Eccles, 1991). In a sense, leading non-financial indicators "drive" the results of the lagging financial indicators.

According to Nielsen *et al.* (2017), identifying the VDs that affect performance is an important step in the identification of KPIs. A value driver refers to any factor that influences the total value created by a company (Montemari and Nielsen, 2014), and it is with reference to these factors that measurement should take place. Ferreira and Otley (2009) argue that a VD is a key activity, competency, or attribute that is considered a critical prerequisite for the success of an organization. Therefore, the identification of VDs and the alignment between VDs and KPIs are considered a critical stage in several performance measurement frameworks proposed in the literature (Franco-Santos, Kennerley, Micheli, Martinez, Mason, Marr, Gray and Neely, 2007, pp. 797-798; Neely *et al.*, 2005, p. 1231). It is important to underline that

different labels have been adopted to describe and discuss VDs in the literature. Kaplan and Norton (1996, p. 116) use the term "critical performance attributes" (e.g. channel mix, cash-to-cash cycle, image and reputation, customer relationship, employee capabilities) to identify VDs and classify them into the Balanced Scorecard's four perspectives (customer perspective, internal perspective, innovation and learning perspective, financial perspective). Dixon, Nanni and Vollmann (1990, p. 29) use the notion of "performance drivers" (e.g. integration with customers, new product introduction) in their Performance Measurement Questionnaire (PMQ) aimed at assessing whether a company's PMS encourages continuous improvement. Finally, Neely, Adams and Crowe (2001, p. 8) use the term "strategic strands" to develop KPI categories based on the five facets of their Performance Prism (stakeholder satisfaction, strategies, processes, capabilities, stakeholder contribution).

According to Chartered Global Management Accountants (2013, p. 54), KPIs that are well designed are able to grasp the company's VDs, catch managerial attention and create guidelines for action, thus increasing the likelihood that the KPIs will be used for managerial purposes (Neely, Richards, Mills, Platts and Bourne, 1997). Even though defining what really matters to companies may appear simple to managers, research has shown that mistakes are often made in this crucial stage (Neely *et al.*, 2005; Neely and Bourne, 2000). This decreases the effectiveness of the PMS as a whole (Bourne, 2008), reducing its ability to guide the managerial decision-making process.

Thus, the ability to express the company's value creation process and identify the VDs and how they combine with one another is particularly relevant in the design and selection of useful KPIs (Bukh, 2003, p. 50; Montemari and Nielsen, 2013, p. 537; Neely, Mills, Platts, Richards, Gregory, Bourne and Kennerley, 2000, p. 1121). Consequently, it is important to use frameworks that are capable of uncovering those VDs that managers can influence, because this will allow performance to be steered (Neely and Bourne, 2000, p. 4).

Identifying and organizing value drivers through business model tools

BMs enable an understanding of how value is created, delivered, and captured (Osterwalder and Pigneur, 2010). In particular, the BM concept allows entrepreneurs and managers to conceptualize the company as a set of interrelated strategic choices concerning: 1) the target customers; 2) the value proposition offered to the target customers; 3) the channels used to reach the target customers; 4) the relationships to develop with the target customers; 5) the key activities and key resources needed to develop the value proposition; and, 6) the partners needed to access key activities and key resources (Morris, Schindehutte, and Allen, 2005). By considering these aspects, the BM concept links the company's strategic initiatives with the processes and activities that lead to the delivery of value. We call these VDs. Different companies have different sets of VDs, depending on what they need to deliver to customers.

According to McGrath (2010), companies create value in different ways because they adopt different BM configurations that in turn rely on different VDs. BM configurations are considered ideal-type examples that describe the behaviour of companies with certain characteristics operating in the real world (Baden-Fuller and Morgan, 2010; Baden-Fuller, Guidici, Haefliger and Morgan, 2017), thus providing managers, practitioners, and academics with formulas that have already been tried and tested in practice (Gassmann *et al.*, 2014; Taran *et al.*, 2016). For instance, "channel maximization" (Linder and Cantrell, 2000) is a BM configuration focused on creating a broad distribution of the offering by using as many channels as possible. An example of this BM configuration in action is the Coca Cola Company, which uses all the possible channels (small retailers, large retailers, corner shops, restaurants, etc.) to ensure the availability and visibility of its brand to the customers and to increase market share. Core VDs of this BM configuration include the company's own channels and the network of partner channels, as well as all the activities around channel development (channel scouting and channel contracting) and outbound logistics management (Taran *et al.*, 2016).

By contrast, "disintermediation" (Johnson, 2010) is a BM configuration that aims to deliver the offering directly to the final customer through the company's own retail outlets, sales force, or web sales, rather than through intermediary channels such as distributors, wholesalers, retailers, agents, or brokers. Dell, for

example, cuts out the retailer and uses customer relationship management (CRM) approaches to capture data on customers' preferences and then respond with the desired products before its competitors can. The main feature of this BM configuration concerns sales of the product exclusively through the company's own channels. Thus, a key VD in this case is establishing close contacts with the customers through personal sales experience so that they can enjoy attractive lower prices, superior service, and customization of the product/service (Dane-Nielsen and Nielsen, 2017).

As illustrated above, different BM configurations have different value creation logics and therefore activate very different sets of VDs. While BM configurations play a relevant role in identifying the VDs of a given company, the Business Model Canvas (Osterwalder and Pigneur, 2010) is a useful tool when it comes to visualizing and organizing the VDs. The nine blocks of the Business Model Canvas pertain to the four main areas of a business: customer interface (customer segments, channels, customer relationships), products and services (value proposition), infrastructure (key activities, key resources, key partnerships), and financial viability (revenue streams, cost structure). Positioning VDs on the Business Model Canvas reveals which building blocks they relate to, which may in turn draw attention to the building that deserve closer managerial focus. More importantly, the Business Model Canvas illustrates how the building blocks are related to one another (Osterwalder and Pigneur, 2010).

For example, VDs associated with "channel maximization" (Linder and Cantrell, 2000) mainly relate to channels (own channels and partner channels), key activities (channel scouting, channel contracting, and outbound logistic management) and key partnerships (network of partner channels). These three building blocks are closely connected with one another in this BM configuration. A managerial action regarding a key activity (e.g. improving channel scouting) is likely to also impact the channels (e.g. increasing availability and visibility of the brand through new channels) and key partnerships (e.g. growing the network of partners). On the other hand, VDs linked to the "disintermediation" BM configuration (Johnson, 2010) are mainly related to channels (company own channels) and customer relationships (close contact with the customers). Here too, the relationship between these two building blocks is very intense, because a managerial decision concerning channels (e.g. activating a new company own channel) is likely to influence customer relationships (e.g. the opportunity to collect additional data on customers' preferences through that new company own channel).

The literature on BMs recognises that BMs significantly affect a company's performance (Rédis, 2009; Zott and Amit, 2007, 2008). Nielsen *et al.* (2009) recognize the usefulness of BMs for linking relevant KPIs to company strategy and Nielsen and Roslender (2015, p. 265) further argue that they have the potential to enable the "entangling of indicators". Entanglement is an important process that decreases the risk that individual KPIs will end up being uncoordinated and unrelated to the company's means of value creation. McGrath (2010) and Nielsen and Montemari (2012) acknowledge that BMs help managers design KPIs that reflect the critical dimensions of firm performance, providing information on what can increase or decrease a company's competitiveness. Montemari and Chiucchi (2017) further recognize that BM configurations can enable the transition from BM to measurement through strategic themes, i.e., an intermediate level of analysis that acts as a bridge between the BM and the items to be measured. Montemari and Chiucchi (2017) thus call for further research on the use of BM tools for measurement purposes.

While it is recognized that BMs can be useful structures for the purpose of identifying relevant KPIs, the current research is still in an early phase. As argued by Bromwich and Scapens (2016, p. 6):

A current 'hot topic' in practice is business models. While much of the content of these models is based on management accounting information, accounting researchers do not seem to be particularly interested in the area. If researchers are to contribute to new practical innovations they need to become involved earlier in the life of those innovations.

Hence, there is a gap regarding the relationship between BMs and performance measurement, as well as a need to understand the process that leads from BMs to performance measurement (Heikkilä, Solaimani, Soudunsaari, Hakanen, Kuivaniemi and Suoranta,

2014; Montemari and Chiucchi, 2017; Nielsen *et al.*, 2017). In light of this, the contribution of this paper is to answer the following research question: How can BMs guide the design of a PMS? In so doing, the paper also explores the advantages and disadvantages of utilizing BMs as a platform for designing PMSs.

Methodology

In order to answer the research question, this study followed a two-step process. First, to fill the gap identified in the literature above, a normative approach was adopted, identifying the potential steps in the process that can lead from BMS to KPIs and highlighting the role of BM configurations and the Business Model Canvas. Such an approach is appropriate for the purpose of prescribing tools, models, standards, and procedures, and recommending how things should be conducted (Ryan, Scapens and Theobald, 2002). In the second phase, the study applied this process to the data collected in a case study in order to test the applicability of the process and to identify advantages and disadvantages. The case study was conducted on two companies that jointly deliver a mobile tracking service. It is illustrative in nature (Berg and Lune, 2012, p. 338), as it aims to apply the process leading from BMs to performance measurement in a concrete setting and to study enablers and barriers that may be encountered when using BMs for performance measurement purposes.

The case was chosen purposefully (Patton, 1990) because these two companies needed to measure their performance and were in the process of designing systems for this purpose (Lund, 2014). In particular, there was frustration resulting from a lack of understanding of the value creation process and both companies were experiencing difficulty identifying and managing their VDs.

Data collection

The basis for this case study consists of four semi-structured interviews conducted with the main actors of the companies involved. This data collection method was chosen because it provides the interviewer with a high degree of flexibility. In particular, the researchers can pay attention to key themes that surface during the interview, increasing their ability to explore the reasoning behind the respondents' actions and interpretation of reality (Kvale and Brinkmann, 2009; Qu and Dumay, 2011). Important themes were identified and formed the main sections of the interview guide:

Single company level:

1. the company's background and overall business;
2. the main factors that affect the value creation of the company and how they are linked to one another;
3. KPIs used in the managerial decision-making process.

Mobile tracking service level:

1. the company's aims in the mobile tracking service;
2. the company's role in the mobile tracking service;
3. the main factors that affect the value creation of the mobile tracking service and how they are linked to one another.

The interviews made extensive use of reflective questions by asking the interviewees for examples, stories, and anecdotes to accompany the points being made, as suggested by Kreiner and Mouritsen (2005). This encouraged the respondents to provide detailed information and, in turn, triggered other related stories and thoughts. The aim of this process was to understand how the value creation logics came "into action" in the companies.

Data analysis

The interview transcripts were analysed through a structural coding approach (Krippendorff, 1980); a coding tree reflecting the key themes of the interview guide was applied to the interview transcripts. This coding approach allowed us to identify the BM configuration (and the related VDs) of the mobile tracking service, using the BM configurations portfolios suggested by Gassmann *et al.* (2014) and by Taran *et al.* (2016). Next, a Business Model Canvas of the mobile tracking service was constructed in order to highlight the crucial aspects of its BM configuration and to reveal where (in and between which building blocks) the VDs were coming into action. Finally, the resulting Business Model Canvas was used as a platform to design KPIs aimed at measuring the VDs deployed when delivering the mobile tracking service.

The process leading from business models to the design of a performance measurement system: the role of business model tools

This section explores the process leading from the BM to the design of a PMS; it identifies the key steps and highlights the role of BM configurations and the Business Model Canvas. The proposed process consists of four steps (Figure 1):

The aim, rationale, and characteristics of each step are described below:

1. **Matching the company's BM to one or more BM configurations and identifying the relevant VDs**
   The aim of this step is to identify the BM configurations and VDs that most closely resemble the company's BM, i.e., its strategic objectives, how the company operates, and the distinguishing elements of its BM. This is an important phase because different BM configurations have different value creation logics and thereby utilize different sets of VDs. This means that each BM configuration results in a different set of VDs. BM configurations, therefore, guide and facilitate the identification of a given company's VDs – a critical prerequisite to performance measurement. Several portfolios of BM configurations have been proposed in the literature (Linder and Cantrell, 2000; Rappa, 2001; Johnson, 2010; McGrath, 2010; Osterwalder and Pigneur, 2010). The most complete BM configuration approaches to date are those used by Gassmann *et al.* (2014) and by Taran *et al.* (2016), who present lists of 55 and 71 BM configurations, respectively. These portfolios offer a variety of BM configurations to choose from and provide a frame of reference for the different value creation logics (and the related VDs) that can be adopted by companies. Once the company's BM is matched to one or more BM configurations, a list of relevant VDs distinguishing the chosen BM configuration(s) can be drawn up. Information used to identify the BM configurations can be collected through interviews and focus groups with key company representatives who possess in-depth knowledge of the company's strategy and operations.

2. **Positioning the VDs according to the building blocks of the Business Model Canvas**
   Once the relevant VDs are identified, a Business Model Canvas can be constructed in order to identify where (in and between which building blocks) the VDs come into action and therefore, also who in the company holds the levers to manage certain VDs. This enables practitioners to highlight those building blocks that deserve closer managerial attention.

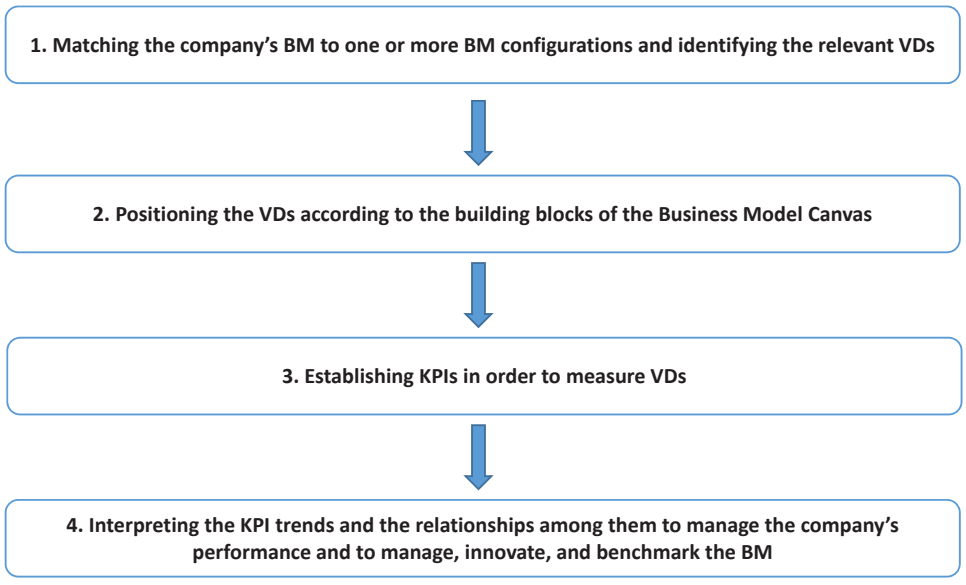


Figure 1: The process leading from BMs to measurement

3. **Establishing KPIs in order to measure VDs**
   The aim of this step is to establish KPIs that should be positioned in, and potentially, between the building blocks of the Business Model Canvas. In this step, the performance measurement literature on rules and guidelines for designing KPIs can be helpful. For instance, combining the principles identified by Globerson (1985) and Maskell (1989), the design process should take into account the following:

   a. the purpose of each KPI must be clear;
   b. it is more advisable to use ratio-based KPIs than absolute numbers;
   c. it is more advisable to use objective KPIs than subjective ones;
   d. non-financial KPIs should be adopted;
   e. KPIs should be simple and easy to use;
   f. KPIs should provide fast feedback;
   g. KPIs should be under the control of the evaluated organizational unit;
   h. KPIs should be designed to stimulate continuous improvement rather than simply monitor;
   i. KPIs should foster benchmarking among companies that operate in the same business;
   j. KPIs should change if circumstances change.

   At this stage, it is beneficial to pinpoint relationships among KPIs, and particularly to understand which KPIs are leading and which are lagging.

4. **Interpreting the KPI trends and the relationships among them in order to manage the company's performance and to manage, innovate, and benchmark the BM**
   The aim of this step is to exploit the information content of the KPIs in three interrelated ways:

   a. by guiding managerial decision making towards the pursuit of the company's strategy, i.e., defining strategic objectives, defining actions to achieve these objectives, and assessing the extent to which the objectives have been achieved;
   b. by identifying and managing strengths and weaknesses in the BM and evaluating the validity of the strategy, i.e., highlighting opportunities to innovate the BM;
   c. by benchmarking the performance of the BM against similar BMs.

It is important to highlight that the four-step process presented here should not be considered prescriptive for any given situation. Rather, a flexible and iterative approach is required when applying the process in order to take into consideration the features of the company concerned and the information needs of its management.

The illustrative case study

Description of the mobile tracking service

The mobile tracking service aims to use location data through a technological platform that can track mobile devices with activated Bluetooth senders, thereby generating anonymous information on the geographic location of people at any given point in time. The location data on people's movements has the potential to be highly valuable for retailers, real estate companies, retailers' associations, and shopping malls in order to support their marketing and managerial decision-making processes. For example, a shopping mall manager may be interested in having information on how long people stay in the shopping mall, how much time people spend in each area of the shopping mall, which path people follow around the shopping mall, how they get to the shopping mall, where people start their shopping trip, and where they walk to afterwards. The availability of this information has the potential to improve the mall manager's decision-making process with regards to staffing, shop locations and shop mixture, advertising panel locations, and the pricing of leasing contracts.

The provision of this service involves two main actors: Detector and Consultant. Detector is the technology provider for the service, as it has created and continues to improve upon technological solutions for detecting people's movements and flows. Using its technological competencies, Detector produces the Bluetooth senders that track mobile devices within a given area. Consultant is the channel through which Detector reaches its market. Through its commercial competencies, Consultant needs to understand the final customer's needs, explain the advantages of using Detector's technological solution, and support Detector in improving the tracking system by discovering the needs of the customers and by validating the precision of the software/technology. In other words, Consultant

is the bridge between Detector and the final users of the location data. Detector and Consultant create economic value through the sale of the Bluetooth senders and the related consulting hours needed to support and maintain the technological platform.

This brief description of the mobile tracking service illustrates the intensity of interactions between the involved companies as their technical and commercial competences can foster (or hinder) value creation. Long-lasting relationships with customers are established through Consultant's reputation and image, allowing Detector to broaden its customer base and further develop its business. In addition, Detector provides high-quality technical solutions that could be difficult for Consultant to find elsewhere.

Thus, alignment of the highly-specialized competences and capabilities of the individual companies is essential in order to meet the customers' expectations and needs. However, in 2012, the time period this paper is focused on, the service was experiencing some problems due to Consultant not deploying its commercial competencies properly, as well as customers' unwillingness to pay for the mobile tracking system because they did not have a clear picture of the strengths and the weaknesses of the solution. This situation was exacerbated by a relatively large employee turnover rate on the Consultant team; the customers could not identify a stable team with which to build a close relationship based on frequent interaction. Therefore, the value creation process stalled. In such a context, identifying the VDs and developing a set of KPIs can be helpful for measuring the joint efforts of the involved companies.

Analysis: Applying the process and deploying business model tools to design key performance indicators

Step 1: Matching the mobile tracking service to one or more BM configurations and identifying the relevant VDs

Our analysis of the interview transcripts allowed us to identify the BM configuration of the mobile tracking service, which, in turn, highlighted its distinguishing VDs. Among the portfolio of BM configurations identified by Gassmann *et al.* (2014) and by Taran *et al.* (2016), the mobile tracking service matches the profile of the "Leverage customer data" BM configuration. It is aimed at collecting, processing, and analysing data on customers in order to provide companies with value-added information regarding customer profiles, behaviours, and attributes. The decision-making process can benefit from this information in terms of generating personalized advertising, discovering dependences between customers' attributes, creating customer loyalty programs, responding to customers' needs in a more effective manner, and grouping customers with similar features (Gassmann *et al.*, 2014).

This BM configuration and its typical VDs are successfully deployed by Amazon, which uses sales data to craft personalized recommendations or customized webpages, thus stimulating further purchases. Another successful example is Google, which generates revenues by placing customized advertisements among search results through the AdWords service. The mobile tracking service adopts a similar rationale as its aim is to generate data on people's movements and flows, which can be highly valuable for retailers, real estate companies, retailers' associations, and shopping malls by supporting their marketing and their managerial decision-making process. In order to pursue this value creation logic, Detector and Consultant use the following VDs, embedded in the BM configuration of "Leverage customer data":

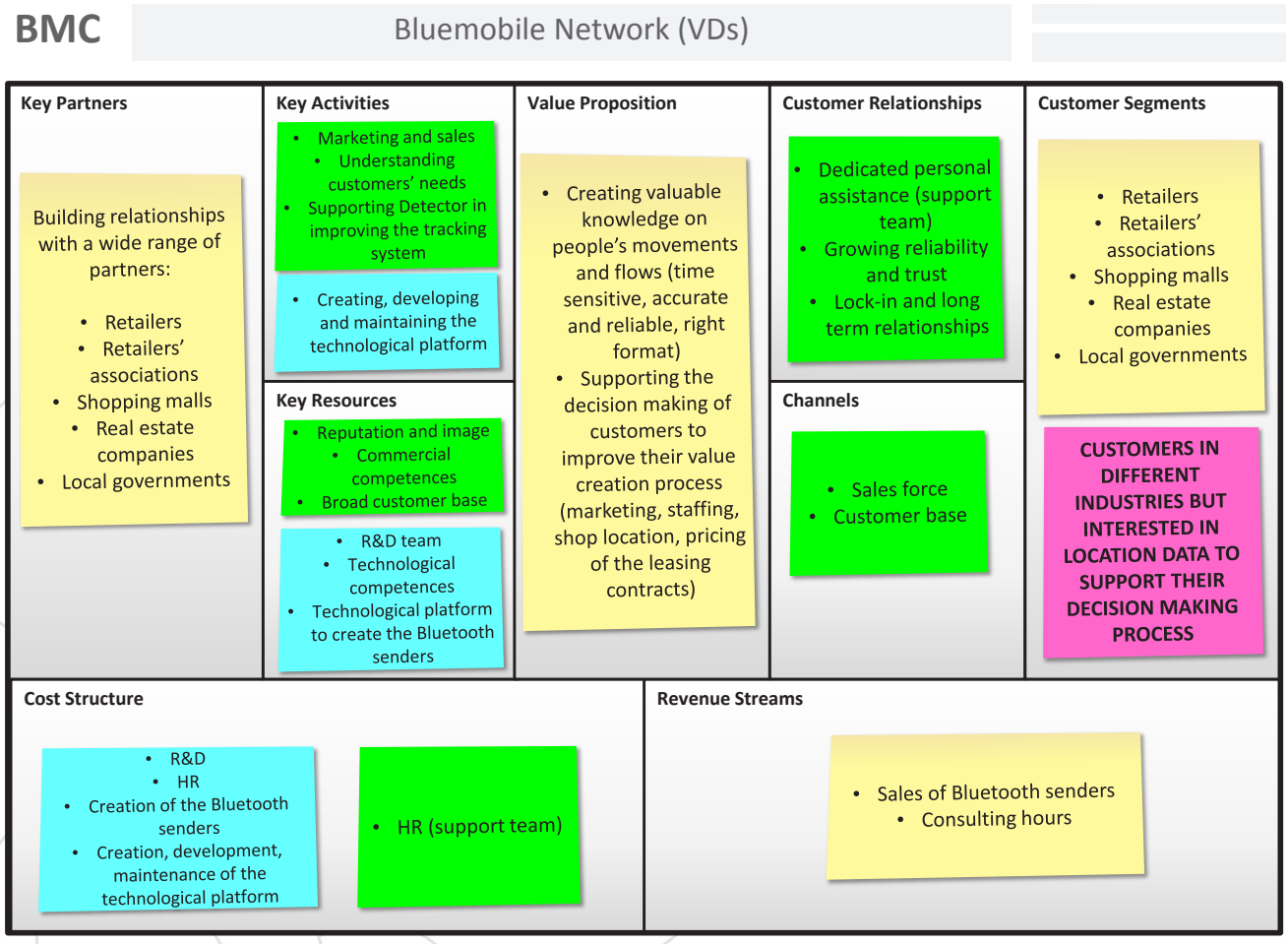
- understanding customers' needs;
- developing effective marketing and sales;
- creating, developing, and maintaining the technological platform;
- growing reputation and image;
- building relationships with a wide range of partners (retailers, retailers' associations, shopping malls, real estate companies, local governments);
- developing a broad customer base;
- building close contacts with the customers;
- developing technological competencies and commercial competencies;
- performing Research and Development (R&D);
- growing reliability and trust;
- developing locked-in relationships, i.e., long-term relationships, with customers.

Step 2: Positioning the VDs according to the building blocks of the Business Model Canvas

The creation of the Business Model Canvas helps to visualize the VDs activated in the mobile tracking service and illustrates its overall value creation logic. Figure 2 illustrates the Business Model Canvas, displaying the roles of the involved companies in the value creation process. Green notes identify the contribution of Consultant to the provision of the service; blue notes identify the VDs activated by Detector; and yellow notes identify the VDs that Consultant and Detector should jointly manage.

The creation and analysis of the Business Model Canvas clarifies the roles of the involved companies, where (in and between which building blocks) each VD comes into action, which building blocks deserve closer managerial attention, and who should manage them. The positioning of the VDs between the building blocks is a particularly significant task. For example, the VD "performing R&D" simultaneously influences three building blocks (key activities, key resources, and cost structure). R&D is a key activity that concerns the creation, development, and maintenance of the technological platform; the R&D team is a key resource needed to perform the activity, and that generates expenses, which is why it has also been positioned in the cost structure building block. The VDs "locked-in and long-term relationships with customers" and "growing reliability and trust" have been positioned within customer relationships, as these VDs identify the nature of the relationships that the case companies aim to build with their customers.

In particular, Figure 2 reveals that the VDs managed by Consultant are crucial in the customer interface area of the Business Model Canvas, i.e., the customer relationships and channels building blocks. Consultant is the bridge to the customer segments. Its sales force and



Yellow: Consultant and Detector; Green: Consultant; Blue: Detector

Figure 2: The Business Model Canvas and the VDs of the mobile tracking service

dedicated personal assistance-based customer service should allow it to penetrate the customer base and establish long-term relationships with customers. The VDs activated by Consultant on the left side of the Business Model Canvas are aimed at improving the customer interface area of the mobile tracking service; the key resources (reputation, image, commercial competencies) should be deployed through key activities (marketing and sales, customer insights) so that the customer interface functions properly, i.e., by improving the effectiveness of the customer relationships and the channels.

To summarize, the analysis reveals that Consultant deploys its VDs and creates value primarily on the right-hand side of the Business Model Canvas, while Detector comes into action in the value configuration area on the left-hand side of the Business Model Canvas; its key resources (R&D team, technological competencies, technological platform) and key activities (exploiting and improving the technological platform) are VDs that are deployed to create and improve the Bluetooth senders to be sold to the customers. In such a context, the information that Consultant obtains directly from the customer can support Detector in improving the tracking system. The Business Model Canvas shown in Figure 2 also reveals a number of VDs that should be jointly managed by Detector and Consultant. For example, the value proposition building block is a common area because the aim of the service is to create valuable knowledge regarding people's movements and flows in order to support customers' decision making that will improve their value creation process.

Customer segments themselves also represent a VD because the value proposition targets customers in different industries (retailers, retailers' associations, shopping malls, real estate companies, local governments) that need location data to support their managerial decision-making process. This means that the technology used is scalable and that Consultant and Detector can replicate this value creation logic in other industries.

The two financially-oriented building blocks of the Business Model Canvas are cost structure and revenue streams. The cost structure building block reflects the rationale of the BM: Detector incurs costs related to the value architecture of the BM (R&D, human resources, technological platform creation, etc.) on the left side of the Business Model Canvas, while Consultant incurs costs concerning the customer interface of the BM (human resources committed to marketing and sales and customer service) on the right side. The revenue streams are a common area and both Consultant and Detector capture value through the sale of the Bluetooth senders and the related consulting hours needed to implement and improve the tracking system.

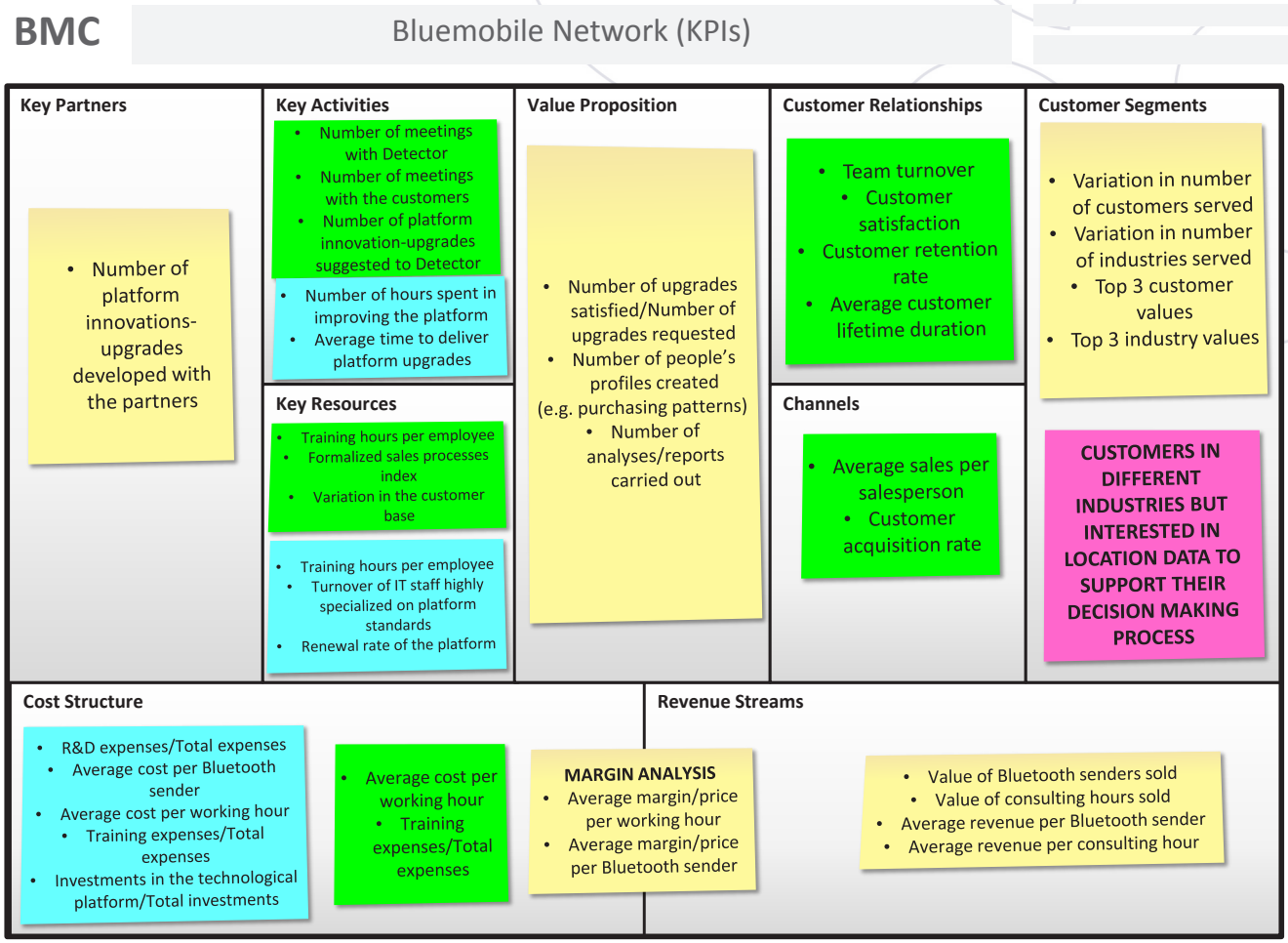
In sum, constructing and analysing the Business Model Canvas allows us to understand how the VDs actually work in providing the mobile tracking service. The Business Model Canvas illustrates the particular ways in which value is generated or destroyed, and hopefully, captured; it therefore has the potential to reveal the strengths and weaknesses of the service provision. An awareness of the strong and weak points provides the companies involved with the opportunity to maximize the former and minimize the latter. In this way, the companies can make the value creation process less fragile.

Step 3: Establishing KPIs to measure VDs

Our analysis shows that the usefulness of the Business Model Canvas could be further increased if it were used as a platform for establishing KPIs to measure VDs. Doing so would reveal how the BM is performing. Figure 3 shows the set of KPIs established from the VDs included in the Business Model Canvas. These KPIs were created according to the design principles mentioned in Section 4. For example, the KPI "Average customer lifetime duration" was established in the customer relationships building block to measure the VD "Locked-in and long-term relationships with customers"; the KPI "Training hours per employee" was created in the key resources building block to measure the VD "Developing technological competences"; and the KPI "Average sales per salesperson" was positioned in the channel building block to measure the VD "Developing effective marketing and sales".

Step 4: Interpreting the KPI trends and the relationships among them in order to manage the performance of the mobile tracking service and to manage, innovate, and benchmark the BM

The design of KPIs at a BM level can primarily be used to measure and monitor the outcomes in each building block and how the outcomes are related to one another, thus supporting managerial decision making. In other



Yellow: Consultant and Detector; Green: Consultant; Blue: Detector

Figure 3: The Business Model Canvas and the KPIs of the mobile tracking service

words, it is beneficial at this stage to pinpoint relationships among KPIs in order to understand which KPIs are leading and which are lagging. For example, Consultant's KPI "Customer acquisition rate" (channels) could be a leading indicator to compare against the measure "Variation in number of customers served" (customer segments), which could in turn affect the trends of the measures "Value of Bluetooth senders sold" and "Value of consulting hours sold" (revenue streams). Raising awareness regarding this chain of relationships could lead Consultant's management to develop and implement specific actions aimed at increasing the "Customer acquisition rate" in order to improve the scores of the connected KPIs in the customer segments and revenue stream, with the final aim of improving the ability to capture value.

Similarly, Detector's KPI "Number of hours spent on improving the platform" (key activities) could drive the measures within the value proposition building block, such as "Number of people's profiles created," which could in turn affect Consultant's "Customer satisfaction" (customer relationships). Here too, identifying these cause-effect relationships could motivate Detector's management to intensify efforts relating to platform improvement, particularly as this would support Consultant in increasing overall customer satisfaction.

Along these lines, designing KPIs based on the BM can provide managers with relevant information on the timing of actions in the building blocks, i.e., the time it takes for a KPI of one building block to begin to influence the measures in related building blocks. A KPI that grasps Detector's key activities (e.g. "Average time to deliver platform upgrades") will probably not affect the value capture of the BM (e.g. "Value of Bluetooth senders sold") in the short run, but it will need a temporal lag of several months. In contrast, leading KPIs

related to customer segments (e.g. "Variation in number of customers served") could influence the lagging indicators in the revenue streams with a much shorter timeframe. The lack of an immediate effect on the revenue streams may simply mean that it takes time for actions to increase the company's ability to capture value. Therefore, management actions that may seem ineffective in the short run (because they generate no immediate effects) might be reconsidered when managers become aware of their potential effects in the medium and long run.

KPIs could also support the process of BM innovation, i.e., the process of refining and updating it. The rationale behind the BM, the VDs, and the relationships among them are, by nature, not fixed. Establishing and observing a given set of KPIs might help to test the relationships among VDs (and their related building blocks) as well as understand whether and how the relevance of the VDs (and their related building blocks) varies over time. In other words, the trends in the KPIs may signal a timing, persistence, or intensity that is not consistent with what was initially considered in the BM. This could provide useful information on possible actions to take in order to innovate the BM over time. For example, a decrease over time in KPIs related to the revenue streams, such as the "Value of Bluetooth senders sold," may signal the need to innovate the value capture mechanisms of the BM by considering alternative options, such as subscriptions, renting, or pay per use (Johnson, 2010).

Similarly, a combined decrease over time in the "Customer retention rate" and "Average customer lifetime duration" in the customer relationships building block may highlight the need to innovate the customer interface of the BM by considering a reconfiguration using, for example, lock-in mechanisms, bait-and-hook mechanisms, or reverse bait-and-hook mechanisms (Gassmann *et al.*, 2014; Osterwalder and Pigneur, 2010). If the managers choose to carry out such BM innovations, the VDs (and their related KPIs) should be modified accordingly. Some VDs and their related KPIs may lose relevance, while other new ones may be identified or crafted in order to monitor the new cornerstones of competitive advantage (Bourne, Mills, Wilcox, Neely and Platts, 2000; Kaplan and Norton, 1996). This happens because "fine-tuning" one building block may entail new challenges and issues in the other ones in terms of key resources to grab, key activities to perform, value propositions to craft, or customer segments to target. Thus, the design of KPIs at the BM level can be used to measure and monitor outcomes in each building block, and also has the potential to stimulate BM innovation.

Finally, KPIs designed based on the BM can support not only managerial decision making (for internal purposes), but also the benchmarking process (for external purposes). By taking the value creation process as the point of departure, KPIs can enable the benchmarking of companies that have adopted the same or a similar BM configuration and that therefore rely on the same or similar VDs. For example, the performance of the mobile tracking service can be benchmarked against the performance of companies adopting the same BM configuration, i.e., "Leverage customer data". For this BM configuration, several key dimensions of performance can be identified and then compared through KPIs: profitability ("Average margin/price per working hour"), openness ("Number of platform innovations-upgrades developed with the partners"), breadth ("Number of industries served"), R&D intensity ("R&D expenses/Total expenses"), attractiveness ("Customer acquisition rate"), timeliness ("Average time to deliver platform upgrades"), and efficiency ("Average cost per working hour"). From an external standpoint, KPIs can act as a reference point and provide information for use in comparing the BMs of different companies, thus contributing to increased awareness regarding the organization's relative position. In other words, measuring performance at the BM level can provide additional performance dimensions to benchmark, thus improving and/or refining the benchmarking processes.

Discussion and Conclusions

The purpose of this paper was to investigate how BMs can guide the design of a PMS, thus responding to a number of calls for more research in this area (Bromwich and Scapens, 2016; Heikkilä *et al.*, 2014; Nielsen *et al.*, 2017). In order to answer the research question, a normative approach was adopted and a model for how a PMS can be designed so that it corresponds to the characteristics of a company's BM has been proposed. The process that leads from a BM to the design of KPIs starts

from the identification of one or more BM configurations that clarify the value creation logic of a company's BM, followed by the identification of the relevant VDs. The VDs are then positioned within the Business Model Canvas in order to understand where (in and between which building blocks) the VDs come into action and which building blocks therefore deserve closer managerial attention. Finally, KPIs are established to measure VDs, and their trends and relationships are used to manage the company's performance and to manage, innovate, and benchmark the BM. These are crucial aspects for the design of a PMS (Franco-Santos *et al.*, 2007; Neely *et al.*, 2005; Nielsen *et al.*, 2017).

In order for the BM tools to have a value-added role in PMS design, a number of aspects emerge. On the one hand, BM configurations lead to the identification of the VDs and the related KPIs. This includes understanding the rationale of the BM and its value creation logic. It also improves the underlying structure for measurement and creates a direction for action, thus diminishing the risk of poor design. The BM configurations force managers to focus only on critical VDs, helping to answer the question, "What should we measure?". The Business Model Canvas, on the other hand, supports the coordination and prioritization of the VDs (and the corresponding KPIs), with the building blocks representing the key performance areas to focus on in the process of positioning the VDs and identifying the KPIs. All in all, the BM strengthens the relevance of the PMS because it directs the measurement process towards the focal aspects of value creation.

A BM-based PMS should accomplish the following:

a. guide managerial decision making towards the pursuit of the company's strategy by defining strategic objectives, defining actions to achieve those objectives, and assessing the extent to which the objectives have been achieved;
b. identify and manage strengths and weaknesses in the BM and evaluate the validity of the BM, i.e., reveal opportunities to innovate the BM;
c. benchmark the performance of the company's BM against similar BMs.

In this paper, the applicability of the normative model has been illustrated through a case study. The study highlighted the applicability of the model and the advantages of using BMs to design PMSs. It has also highlighted some areas where care and attention are required. For example, the application of the normative model to the mobile tracking service revealed that the process leading from BMs to KPIs is a complex one, and the case is made for utilizing "PMS designers" who have an in-depth knowledge of BM configurations and the Business Model Canvas. Knowledge of both tools and of how they interact is crucial for informing management decisions.

From a theoretical perspective, the paper contributes to addressing the research gap around how to move from the BM to the design of a PMS by proposing a normative model and testing its applicability. In so doing, the paper confirms that BMs are useful units of analysis for designing KPIs (McGrath, 2010; Montemari and Chiucchi, 2017; Nielsen and Montemari, 2012). BMs help to uncover and organize crucial aspects of the value creation process, like the company's value proposition, key partnerships, key channels, customer segments, and customer relationships. Moreover, the paper pushes this line of reasoning even further by identifying other advantages and disadvantages of using BMs for measurement purposes. On the one hand, designing KPIs from the BM increases the relevance of the resulting PMS because there are BM tools to support the identification, coordination, and prioritization of the VDs. This increases the likelihood that the managerial decision making will focus on the critical aspects of value creation. On the other hand, the process that leads from the BM to KPIs is a deceptively complex one.

The current paper also confirms that BMs can support the process of "entangling" the KPIs (Nielsen *et al.*, 2009, p. 9; Nielsen and Roslender, 2015, p. 265) and explores the underlying reason: the BM provides a context in which KPIs can be designed, coordinated, prioritized, and then interpreted because it embeds the key performance areas (the building blocks) where VDs and KPIs are positioned. This, in turn, helps avoid the risk that KPIs may end up being untied from the company's flow of value creation. Moreover, the paper refines the process proposed by Montemari and Chiucchi (2017) for moving from the BM to the design of a PMS by adding an additional step, namely the positioning of the VDs in the building blocks of the Business Model Canvas to

improve the coordination and prioritization of the VDs (and the related KPIs).

Furthermore, this work contributes to the literature stream on BM innovation, a topic that has recently caught the attention of researchers and practitioners alike (Lüttgens and Montemari, 2016; Schneider and Spieth, 2013; Wirtz *et al.*, 2016). Indeed, the highly competitive global business environment is forcing companies to renew their BMs more frequently; thus, managers and practitioners need tools that can support them to respond to this challenge (Taran *et al.*, 2016). This paper shows that KPIs can also lead to identifying and managing the strengths and weaknesses of the BM, thus revealing opportunities to innovate the BM itself. Finally, the paper confirms that KPIs designed from BMs can facilitate the process of benchmarking companies that have adopted the same or a similar BM configuration and that rely on the same or similar VDs (Nielsen *et al.*, 2017).

From a practical standpoint, this article describes an implementation process that can be adopted by managers to map the BM of their companies, to identify and organize the VDs, and to design KPIs. This process can also be useful for managers who have already mapped the BM of their companies and who aim to exploit this platform not only for strategy operationalization purposes, but also to design a PMS. As stated above, such a plug-in function has the potential to support the decision-making process used to manage the company's performance and to manage, innovate, and benchmark the BM.

In closing, it is important to acknowledge the limitations of this paper. General limitations of case-based research should be acknowledged. Further research avenues could investigate the design of a PMS through interventionist case studies that put BM tools into practice and could investigate not only the design phase of KPIs, but also the implementation and use phases.

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About the Authors

Marco Montemari, PhD, is an Assistant Professor at the Università Politecnica delle Marche (Ancona, Italy). His research interests concern management accounting, intellectual capital and business models. Other relevant interests concern balanced scorecard and performance measurement systems, overall with regard to their design and implementation process and to their ability to map and measure the value creation process. Marco's research has been published, amongst others, in Journal of Intellectual Capital and European Journal of Innovation Management.

Maria Serena Chiucchi is Full Professor at the Università Politecnica delle Marche (Ancona - Italy). Her main research interests are in management accounting, performance measurement and Intellectual Capital accounting. She is member of national and international research groups on Intellectual Capital and management accounting. She is a member of the editorial boards and of the advisory boards of several national and international journals.

Christian Nielsen, PhD, is Professor at Aalborg University in Denmark. He is the Head of the Department Business and Management at Aalborg University. Christian has previously worked as an equity strategist and macro economist focusing specially on integrating Intellectual Capital and ESG factors into business model valuations. His PhD dissertation from 2005 won the Emerald/EFMD Annual Outstanding Doctoral Research Award, and in 2011 he received the Emerald Literati Network Outstanding Reviewer Award. Christian Nielsen has a substantial number of international publications to his record and his research interests concern analyzing, evaluating and measuring the performance of business models. Public profile available on http://www.linkedin.com/in/christianhnielsen and http://personprofil.aau.dk/profil/115869#